Claims

1 Apparatus for the movement of fluid, said apparatus including a feed pump and scavenge pump for use in conjunction with a reservoir which liquid is moved to and from by the feed pump and scavenge pump said pumps each include inner and outer rotary pump members housed in respective pump chambers in a body portion, with said inner rotary pump members mounted for rotation by a driveshaft; said body portion including formed therein, inlet and outlet bores in connection with respective feed and scavenge pump chambers, said bores formed in the body to allow connection with a crankshaft and reservoir for the feed pump and a sump and reservoir for the scavenging pump, and characterised in that each of said bores are provided with a first end opening on a first side of the body and an opposing end terminating at a respective pump chamber.

2 Apparatus according to claim 1 characterised in that the four bores formed in the body are shaped to curve with respect to at least two of the XY and Z axes.

3 Apparatus according to claim 2 characterised in that the four bores formed in the body are each shaped to curve with respect to the three XY and Z axes.

4 Apparatus according to claim 1 characterised in that the end of each bore which terminates in the respective pump chambers lies in a plane substantially perpendicular to the axis of rotation of the driveshaft for the inner rotary pump members.

5 Apparatus according to claim 1 characterised in that the scavenge and feed pumps each comprise a pumping chamber with an outer rotary pump member and an inner rotary pump

member, said inner rotary pumping member mounted eccentrically with respect to the outer rotary pump member and mounted for rotation on a driveshaft.

6 Apparatus according to claim 5 characterised in that the outer rotary pumping member in each pump is driven by the inner rotary member.

7 Apparatus according to claim 1 characterised in that the driveshaft is common to the inner rotary pumping members of the feed and scavenge pumps.

8 Apparatus according to claim 1 characterised in that the operation of the respective feed and scavenge pumps is staggered in an epicoidal manner.

9 Apparatus according to claim 1 characterised in that the operation of the feed and scavenge pumps is sequential.

10 Apparatus according to claim 8 or 9 characterised in that the said drive shaft is controlled by a gearbox to rotate in forward and reverse directions for predetermined periods of time therefore allowing the controlled operation of the feed and scavenge pumps.

11 Apparatus according to claim 1 characterised in that the apparatus is provided to be retrofitted as a replacement component to an existing combustion engine.

12 Apparatus according to claim 11 characterised in that fixing locations are provided in the body to allow the reception of location means for the apparatus.

13 Apparatus according to claim 12 characterised in that the bores bypass the fixing locations as they pass through the body.

14 Apparatus according to claim 12 characterised in that the openings for the bores on the body surface are provided to be at locations to allow connection with the crankshaft, sump and oil reservoir ports.

15 Apparatus according to claim 1 characterised in that the components of the arrangement are sintered and heat treated to provide resistance to wear.

16 A feed pump for removing liquid and a scavenge pump for introducing liquid from and to an oil reservoir of an engine, said feed and scavenge pumps including inner and outer rotary pump members housed in respective pump chambers in a body portion, said inner rotary pump members each mounted on a common driveshaft and said body portion including formed therein, inlet and outlet bores in connection with respective feed and scavenge pump chambers, said bores formed in the body to allow connection with the crankshaft and reservoir for the feed pump chamber and a sump and reservoir for the scavenging pump chamber and characterised in that each of said bores are provided with a first end opening on a first side of the body and an opposing end terminating at a respective pump chamber surface lying in a plane substantially perpendicular to the axis of rotation of the driveshaft of the inner rotary pump members.